

## RESULTS OF THE QUASI-STEADY ACCELERATION ENVIRONMENT FROM THE STS-62 AND STS-65 MISSIONS

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### ABSTRACT

One of the clear benefits of conducting scientific research in space is to take advantage of the reduced acceleration environment. Many accelerometer packages have proven to accurately measure the acceleration environment at frequency levels above one Hz. However, for particular classes of experiments the quality of science returns is a direct function of the extremely low frequency ( $< 0.01$  Hz), quasi-steady acceleration environment. One class particularly interested in this acceleration regime is the group of crystal growth experimenters. These scientists are primarily interested in knowing the resultant quasi-steady acceleration vector at their respective crystal growth locations. The objective of many of these scientists is to minimize the amount of convective flow acting in a direction perpendicular to the growth axis of the crystal. Convective flow within the crystal can be induced by the direction and magnitude of the quasi-steady acceleration vector. Convective flows acting perpendicular to the growth axis of the crystal can cause nonuniformity within the crystal, thus reducing the quality of the results. The Orbital Acceleration Research Experiment (OARE), an accelerometer package hardmounted to the bottom of the payload bay of the orbiter Columbia (OV-102), has the capability of monitoring and recording the quasi-steady acceleration environment. This paper will describe the components that make up the on-orbit quasi-steady acceleration environment, detail how results from the OARE device were achieved, and compare modelled acceleration results with actual on-orbit OARE results from the STS-62

and STS-65 flights. A summary of the results will be provided along with possible recommendations of how to combine modelled and realtime quasi-steady accelerometer data for future Shuttle flights.